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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/894,136	06/29/2001	Linda J. Rankin	219.40018X00	5744

7590 11/07/2006

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EXAMINER	
PHAN, TRI H	
ART UNIT	**PAPER NUMBER**
2616	

DATE MAILED: 11/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/894,136	Applicant(s) RANKIN ET AL.
	Examiner Tri H. Phan	Art Unit 2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 29 August 2006.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-24,26 and 27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-13 and 15-22 is/are rejected.

7)☒ Claim(s) 14,23,24,26 and 27 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment/Arguments

1. This Office Action is in response to the Response/Amendment filed on August 29th, 2006. Claim 25 is now canceled. Claims 1-24 and 26-27 are now pending in the application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 13 is rejected under 35 U.S.C. 102(e) as being anticipated by **Joseph et al.** (U.S.6,628,615; hereinafter refer as '**Joseph**').

- In regard to claim 13, **Joseph** discloses, *a system comprising*

a first node (for example see figure 2 wherein the "*first node*" is the combination of transport agent 200 and second level channels SLCs, e.g. SLC_1-SLC_j);

a second node (for example see figure 2 wherein the "*second node*" is the combination of network 206 and first level channels FLCs, e.g. FLC_1-FLC_k);

at least one physical connection connecting said first node to said second node (for example see figure 2; col. 2, lines 4-11; wherein the connections connects between SLCs and FLCs, e.g. "physical connection", and carries data for the channels);

a processor bus connected to said second node (for example see figures 1 and 2; wherein the network 206 is connected to the FLCs);

a first data channel and a second data channel (SLC_1-SLC_j in figure 2) *each having a first end in said first node and a second end in said second node, and both channels being carried by said physical connection* (for example see figure 2; wherein each SLC carries data and has an end in the first node and an end in the second node); *and*

said channels carrying data packets divided into flits, with flits from both channels being interleaved in said physical connection (for example see figures 2, 4; col. 6, lines 32-67; wherein packets are divided into flits, interleaves by the mux 401 and transmitted over channels) *based on whether flits are available for a transfer* (for example see figures 2-4; whenever the transport agent 200 receives packets or message for transfer as disclosed in figure 2; col. 4, lines 39-42, the second level channel puts the information into the frame buffer 307, 309 as disclosed in figures 2-3; col. 5, lines 37-43; and flits come out of the second level channels for input into the flit handler device 203, e.g. "*whether flits are available for a transfer*", for filling up into the availability of free slots and transferring onto the corresponding channels through the network to destination as disclosed in col. 6, lines 23-58).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Joseph et al.** (U.S.6,628,615).

- Regarding claims 15-16, **Joseph** discloses all the subject matter of the claimed invention as discussed in Part 3 above of this Office action, *wherein flits are interleaved and transferred over said first and second data channels* (for example see figures 2, 4; col. 6, lines 32-67; wherein packets are divided into flits, interleaves by the mux 401 and transmitted over channels). Though, **Joseph** fails to explicitly disclose, wherein the flits are interleaved based on whether the "*determination of the receiving end is able/unable to receive more flits*". However, it is obvious that the determination of able/unable to receive more flits at the receiving end can implementing into the request/response transactions as disclosed in col. 5, lines 61-63; in order to provide the triggering for the transactions, which indicates the receiving end is able/unable to receive more flits.

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention was made to implement the determination of able/unable to receive more flits at the receiving end into the request/response transaction as taught by **Joseph**; with the motivation

being to indicate whether the receiving end is able/unable to receive more flits based on the transaction request as disclosed in col. 5, lines 61-63.

6. Claims 1-12 and 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Joseph et al.** (U.S.6,628,615) in view of **Walsh et al.** (U.S.5,329,521; hereinafter refer as '**Walsh**').

- In regard to claims 1 and 17, **Joseph** discloses, *an apparatus* ('two level virtual channel network interface' 103-105, 116, 118-119 in figures 1-2) *comprising*

a first node including a first end of a first channel and a first end of a second channel (for example see figure 2 wherein the "*first node*" is the combination of transport agent 200 and second level channels SLCs, e.g. SLC_1-SLC_j; and each end of the SLCs is the first end of that SLC channel, e.g. first end of a first channel, first end of a second channel, etc.);

a second node including a second end of a first channel and a second end of a second channel (for example see figure 2 wherein the "*second node*" is the combination of network 206 and first level channels FLCs, e.g. FLC_1-FLC_k; and each end of the FLCs is the second end of that FLC channel, e.g. second end of a first channel, second end of a second channel, etc.);

a physical connection joining said first node and said second node through which signals of both said first channel and said second channel are carried (for example see figure 2; col. 2, lines 4-11; wherein the connections connects between SLCs and FLCs, e.g. "physical connection", and carries data for the channels). **Joseph** does disclose about the "*controller*" for controlling the request and response transactions for the node 'source or destination node', e.g.

"*being in communication*" as disclosed in col. 5, lines 61-63; and "*controlling interleaving of data from the two channels through the physical connection*" as disclosed in figures 2, 4; col. 3, line 40-48; col. 6, lines 59-67 wherein packets are divided into flits, interleaves by the mux 401 and transmitted over channels;

based on availability of valid data in said two channels to be transferred (for example see figures 2-4; whenever the transport agent 200 receives packets or message for transfer (see figure 2; col. 4, lines 39-42), the second level channel puts the information into the frame buffer 307, 309 (figures 2-3; col. 5, lines 37-43) and flits come out of the second level channels for input into the flit handler device 203, e.g. "*based on availability of valid data in said two channels to be transferred*", for filling up into the availability of free slots and transferring onto the corresponding channels to destination (for example see col. 6, lines 23-58) and wherein the token counter flow control device passes the token counter 306, 308 for indicating the availability of free slots in the corresponding frame buffer 307, 309 as disclosed in col. 6, lines 23-31; with the valid bit 302 information about packets, that are transmitted across the network as disclosed in col. 5, lines 51-54; and checked by the error detection as disclosed in col. 7, lines 46-47, e.g. "*valid data*"; but fails to explicitly disclose separate controller for each channel, e.g. "*first/second controllers*". However, such implementation is known in the art.

For example, **Walsh** discloses an apparatus (figure 1) for transferring data packets comprising: a first node (figure 1 @14 &18 are considered a single node) including a first end of a first channel (figure 4 @ 32) and a first end of a second channel (figure 4 @ 34) a second node (figure 1 @ 16 & 20 are considered a single node) including a second end of a first channel (figure 4 @ 32, since the two nodes are the same equipment at a different location) and a second

end of a second channel (figure 4 @ 34); a physical connection joining said first node and said second node through which signals of both said first channel and said second channel are carried (figure 1@ 10 &12, physical connections); a first controller (*"first/second controllers"*; figure 4 @ 36, LAN controller) connected to said first end of said first channel (figure 4 shows LAN controller 36 connected to first end of 32) and a second controller (*"first/second controllers"*; figure 4 @ 38, LAN controller) connected to a first end of said second channel (figure 4 shows LAN controller 38 connected to first the end of 34), said first controller and said second controller being in communication (figure 2 shows connection between controllers) and controlling interleaving of data through said physical connection (col. 3, lines 43-49, both controllers interleave data through link 10 and 12).

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention was made to use each controller, e.g. *"first/second controllers"*, for different channels such as transmitting channels and receiving channels as taught by **Walsh** at the **Joseph**'s source node, for the purpose of reduce latency in processing data with multiprocessor system as disclosed in col. 1, lines 12-15. The motivation being that this can improve the performance of data transmission through the network.

- Regarding claims 2 and 3, **Joseph** does disclose the controller for controlling the request and response transactions for the node ' source or destination node', e.g. *"being in communication"* as disclosed in col. 5, lines 61-63; *obtaining information on whether the second ends of said two channels can accept more data* (for example see figure 3; col. 6, lines 23-31; where the token passing mechanism provides information about the availability of free slots in

each corresponding frame buffer for "*accepting more data*"); and for *controlling the interleaving of data further based on said information* (for example see figure 3; col. 6, lines 23-67); but further fails to explicitly disclose separate controller for each channel, e.g. "*third/fourth controllers*". However, such implementation is known in the art.

For example, **Walsh** further discloses about the *third controller* (figure 4 @ 36, LAN controller; since the two nodes are the same equipment at a different location, the first node figure 1 @ 14 & 18, is the same as the second node figure 1 @ 16 & 20) connected to the second end of the first channel (figure 4, LAN controller 36 connected to the first end of 32) and the *fourth controller* (figure 4 @ 38, LAN controller) connected to the second end of the second channel (figure 4, LAN controller 38 connected to the first end of 34), *said controllers being in communication with each other* (figure 2 shows connection between controllers).

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention was made to use each controller for different channels such as transmitting channels and receiving channels at the destination node as taught by **Walsh** at the **Joseph**'s source node, for the purpose of reduce latency in processing data with multiprocessor system as disclosed in col. 1, lines 12-15. The motivation being that this can improve the performance of data transmission through the network.

- In regard to claims 4 and 5, **Joseph** further discloses, the *queue* ('frame buffer 307 and 309' or 'packet buffer 312' in fig. 3) *for receiving data packets from the second end of the first channel and the second end of the second channel and for delivering the packets to the processor bus* ('interconnection 109-111, 113, 117, and 115' in fig. 1); *wherein said processor bus carries*

packets and said physical connection carries flits (for example see figure 2 where the connections between the $SLC_{1\text{-}j}$ and the transport agent, or the interconnection 109-111, 113, 117, and 115 in fig. 1, e.g. "*processor bus*"; which carry packets; and where the connections between the $SLC_{1\text{-}j}$ and the $FLC_{1\text{-}k}$ carry the flits, e.g. "*physical connection*").

- Regarding claim 6, **Joseph** further discloses, wherein said first node and said second node are connected by a second physical connection which carries both a third channel and a fourth channel (for example see figure 2 wherein, it is obvious that the connections between the $SLC_{1\text{-}j}$ and the $FLC_{1\text{-}k}$, are "*first and second physical connections*") or where the separate wire for each direction ("*second physical connection*") on bi-directional links (for example see col. 5, lines 15-21; col. 7, lines 38-41).

- In regard to claim 7, **Joseph** discloses, *a method comprising*

determining availability of valid data in each of at least two channels (for example see figure 3; wherein the token counter flow control device passes the token counter 306, 308 for indicating the "*availability*" of free slots in the corresponding frame buffer 307, 309 with the valid bit 302 information about packets, that are transmit across the network as disclosed in col. 5, lines 51-54; col. 6, lines 23-31; and checked by the error detection as disclosed in col. 7, lines 46-47, e.g. "*valid data*"), *wherein said at least two channels share a physical connection to transfer data between a first node and a second node* (for example see figure 2; wherein the "*first node*" is the combination of transport agent 200 and second level channels SLCs, e.g. SLC_1-SLC_j; and the "*second node*" is the combination of network 206 and first level channels

FLCs, e.g. FLC_1-FLC_k; wherein the connections connects between SLCs and FLCs, e.g. "*physical connection*", and carries data for the channels between the first and second nodes);

determining backpressure from a receiver of each channel ('response transaction'; for example see col. 5, lines 59-63; col. 8, lines 23-25. Even though, **Joseph** does not explicitly use the word "*backpressure*"; however, it is obvious that the response from the destination for the request from the source is the "*backpressure*" from the destination to the source and wherein the response transaction in the collection of FIFO's is the "*backpressure from a receiver of each channel*"); *and*

interleaving flits from said at least two channels along the physical connection based on availability of valid data and said backpressure (for example see figures 2-4; col. 6, lines 23-67; wherein packets are divided into flits, interleaves by the mux 401 and transmitted over channels and whenever the transport agent 200 receives packets or message for transfer (see figure 2; col. 4, lines 39-42), the second level channel puts the information into the frame buffer 307, 309 (figures 2-3; col. 5, lines 37-43) and flits come out of the second level channels for input into the flit handler device 203, e.g. "*based on availability of valid data in said two channels to be transferred*", for filling up into the availability of free slots and transferring onto the corresponding channels to destination (for example see col. 6, lines 23-58); and wherein the packets/flits are processing between FLCs and SLCs based on the availability of free slots in each frame buffer based on the request and response transactions, e.g. "*backpressure*" from the receiving to the sending, as disclosed in col. 5, lines 59-63; col. 8, lines 23-25.

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention was made to implement the response transaction for the request as taught by

Joseph as the "*backpressure*", for the purpose of optimizing data transfer with more dynamic as specified in col. 8, lines 2-6. The motivation being that this can improve the performance of data transaction through the network.

- Regarding claims 8-10, **Joseph** also discloses the method of claim 7 further comprising *reforming said flits into packets at the other end of said channels and storing said reformed packets in queues for transfer to a processor bus* (for example see figures 2-3; col. 6, lines 55-58; where the packets are stored in the packet memory 301 in figure 3, e.g. "*queues*", and transmitted via the transport agent through network, e.g. "*processor bus*"); *and wherein said processor bus transfers data in a different type of resource sharing paradigm than said physical connection* (for example see figures 2, 4-5; col.7, line 64 through col. 8, line 6; wherein packets/flits are converted and transmitted through connections, e.g. "*processor bus*" and "*physical connection*").

- In regard to claim 11, **Joseph** further discloses the method of claim 7 further comprising *transferring said flits from each channel across the physical connection, in response to determining that valid data is unavailable in the other channel* (for example see figures 4-5; where the packet flits are transmitted through the latency sensitive and bandwidth sensitive, e.g. "*physical connection*", based on the availability of free slots in each frame buffer with the valid bit, e.g. "*valid data*", as disclosed in col. 6, lines 23-31; and based on the determination of the message priority as disclosed in col. 7, lines 8-21; therefore, it is obvious that the "*valid data*" is transmitted through latency or bandwidth sensitive connections as disclosed in figure 2; which

are based on the priority, e.g. where the priority is the condition in determining "*available*" or "*unavailable*" for the connections).

- Regarding claims 12 and 19-20, **Joseph** further discloses the method of claim 7 further comprising

transferring said flits from each channel across the physical connection, in response to determining that the other channel is receiving backpressure from the receiver (for example see figure 6; col. 7, lines 34-43; wherein the side band carries information such as flow control and the main path carries flits on bi-direction links; or by the response transaction from the destination for the request from the source as disclosed in col. 5, lines 59-63). Even though, **Joseph** does not explicitly use the word "*backpressure*"; however, it is obvious that the response from the destination for the request from the source is the "*backpressure*" from the destination to the source.

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention was made to implement the "*backpressure*" as the response transaction for the request as taught by **Joseph**, for the purpose of optimizing data transfer with more dynamic as specified in col. 8, lines 2-6. The motivation being that this can improve the performance of data transmission through the network. **Joseph** fails to explicitly disclose about separate controller for each channel, e.g. "*first/second controllers*". However, such implementation is known in the art.

For example, **Walsh** discloses an apparatus (figure 1) for transferring data packets comprising: a first node (figure 1 @14 &18 are considered a single node) including a first end of a first channel (figure 4 @ 32) and a first end of a second channel (figure 4 @ 34) a second node

(figure 1 @ 16 & 20 are considered a single node) including a second end of a first channel (figure 4 @ 32, since the two nodes are the same equipment at a different location) and a second end of a second channel (figure 4 @ 34); a physical connection joining said first node and said second node through which signals of both said first channel and said second channel are carried (figure 1@ 10 &12, physical connections); a first controller (*"first/second controllers"*; figure 4 @ 36, LAN controller) connected to said first end of said first channel (figure 4 shows LAN controller 36 connected to first end of 32) and a second controller (*"first/second controllers"*; figure 4 @ 38, LAN controller) connected to a first end of said second channel (figure 4 shows LAN controller 38 connected to first the end of 34), said first controller and said second controller being in communication (figure 2 shows connection between controllers) and controlling interleaving of data through said physical connection (col. 3, lines 43-49, both controllers interleave data through link 10 and 12).

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention was made to use each controller, e.g. *"first/second controllers"*, for different channels such as transmitting channels and receiving channels as taught by **Walsh** at the **Joseph**'s source node, for the purpose of reduce latency in processing data with multiprocessor system as disclosed in col. 1, lines 12-15. The motivation being that this can improve the performance of data transmission through the network.

- In regard to claim 18, **Joseph** further discloses about the method for *sending data across said physical connection, in response to determining that only the channel connecting to the one controller has valid data* ('valid bit' information about the packet; for example see figure

3; elements 302 and 302'; col. 5, lines 51-54); but fails to explicitly disclose separate controller for each channel, e.g. "*first/second controllers*". However, such implementation is known in the art.

For example, **Walsh** discloses an apparatus (figure 1) for transferring data packets comprising: a first node (figure 1 @14 &18 are considered a single node) including a first end of a first channel (figure 4 @ 32) and a first end of a second channel (figure 4 @ 34) a second node (figure 1 @ 16 & 20 are considered a single node) including a second end of a first channel (figure 4 @ 32, since the two nodes are the same equipment at a different location) and a second end of a second channel (figure 4 @ 34); a physical connection joining said first node and said second node through which signals of both said first channel and said second channel are carried (figure 1@ 10 &12, physical connections); a first controller ("*first/second controllers*"; figure 4 @ 36, LAN controller) connected to said first end of said first channel (figure 4 shows LAN controller 36 connected to first end of 32) and a second controller ("*first/second controllers*"; figure 4 @ 38, LAN controller) connected to a first end of said second channel (figure 4 shows LAN controller 38 connected to first the end of 34), said first controller and said second controller being in communication (figure 2 shows connection between controllers) and controlling interleaving of data through said physical connection (col. 3, lines 43-49, both controllers interleave data through link 10 and 12).

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention was made to use each controller, e.g. "*first/second controllers*", for different channels such as transmitting channels and receiving channels as taught by **Walsh** at the **Joseph**'s source node, for the purpose of reduce latency in processing data with multiprocessor

system as disclosed in col. 1, lines 12-15. The motivation being that this can improve the performance of data transmission through the network.

- In regard to claim 21, **Joseph** discloses, *a method comprising, in response to determining that only the first controller has data to send* (for example see col. 5, lines 61-63; where the controller generates request transaction for data sent), *sending data via the first controller* (for example see col. 7, lines 8-21; wherein, based on the determination of the message priority, data is transmitted through latency or bandwidth sensitive connections as disclosed in figure 2; therefore, it is inherent the message with priority is transmitted through the bandwidth sensitive connections, e.g. "*only the first controller has data to send*"); but fails to explicitly disclose separate controller for each channel, e.g. "*first/second controllers*". However, such implementation is known in the art.

For example, **Walsh** discloses an apparatus (figure 1) for transferring data packets comprising: a first node (figure 1 @14 &18 are considered a single node) including a first end of a first channel (figure 4 @ 32) and a first end of a second channel (figure 4 @ 34) a second node (figure 1 @ 16 & 20 are considered a single node) including a second end of a first channel (figure 4 @ 32, since the two nodes are the same equipment at a different location) and a second end of a second channel (figure 4 @ 34); a physical connection joining said first node and said second node through which signals of both said first channel and said second channel are carried (figure 1@ 10 &12, physical connections); a first controller ("*first/second controllers*"; figure 4 @ 36, LAN controller) connected to said first end of said first channel (figure 4 shows LAN controller 36 connected to first end of 32) and a second controller ("*first/second controllers*";

figure 4 @ 38, LAN controller) connected to a first end of said second channel (figure 4 shows LAN controller 38 connected to first the end of 34), said first controller and said second controller being in communication (figure 2 shows connection between controllers) and controlling interleaving of data through said physical connection (col. 3, lines 43-49, both controllers interleave data through link 10 and 12).

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention was made to use each controller, e.g. "*first/second controllers*", for different channels such as transmitting channels and receiving channels as taught by **Walsh** at the **Joseph**'s source node, for the purpose of reduce latency in processing data with multiprocessor system as disclosed in col. 1, lines 12-15. The motivation being that this can improve the performance of data transmission through the network.

- Regarding claim 22, **Joseph** fails to explicitly disclose about the step of *determining which controller was the last one to send data*. However, in determining the priority for the sending message, the flit handler has held the low priority message for formatting and composing new flits with the high level priority message, and notified the flit scheduler when the flit composition is done for the transmission on the network as disclosed in col. 7, lines 21-31. Thus, it is obvious that the flit handler and flit scheduler hold the status of *which controller was the last one to send data*.

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention was made to implement the determination of *which controller was the last one to send data* for storing in the **Joseph**'s flit handler and scheduler, for the purpose of providing the

sequence status of low/high priority messages in composition and transmission on the network. The motivation being that this can improve the performance of data process and transmission through the network.

Response to Amendment/Arguments

7. Applicant's arguments filed on August 29th, 2006 with respect to claims 1-13 and 15-22 have been considered but they are not persuasive.

Pages 10-12 of applicant's REMARKS, with respect to claims 13, 15 and 16, applicant asserts that **Joseph** does not disclose where the flits are interleaved based on "*whether flits are available for a transfer*" (see claim 13) and/or "*whether a receiving end of each channel is able/unable to receive more flits*" (see claims 15 and 16). The examiner respectfully disagrees. **Joseph** discloses, whenever the transport agent 200 receives packets or message for transfer (see figure 2; col. 4, lines 39-42), the second level channel puts the information into the frame buffer 307, 309 (figures 2-3; col. 5, lines 37-43) and flits come out of the second level channels for input into the flit handler device 203, e.g. "*whether flits are available for a transfer*", for filling up into the availability of free slots and transferring onto the corresponding channels to destination (for example see col. 6, lines 23-58). **Joseph** also discloses, wherein flits are interleaved and transferred over channels (see figures 2, 4; col. 6, lines 32-67; wherein packets are divided into flits, interleaves by the mux 401 and transmitted over channels). Though, **Joseph** fails to explicitly disclose, wherein the flits are interleaved based on whether the

"*determination of the receiving end is able/unable to receive more flits*". However, it is obvious that the determination of able/unable to receive more flits at the receiving end can implementing into the request/response transactions as disclosed in col. 5, lines 61-63; in order to provide the response, which indicates whether the receiving end is able/unable to receive more flits, based on the transaction request. Therefore, Examiner concludes that **Joseph** teaches the arguable features.

In response to Applicant's argument that the references fail to show the flits coming out of the second level channels for input into a flit handler device 230 are not "actually packets" that pass from the transport agent to the second level channels, rather "information describing the packets". It is noted that the feature upon which Applicant relies (i.e., actually packets) is not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir.1993). It also notes that the flit handler at the sending/receiving sides repackages and recomposes the flit format with the payload data for forwarding to respective first level channel as disclosed in col. 6, lines 43-58.

Pages 12-13 of applicant's REMARKS, with respect to claims 1-12 and 17-22, applicant asserts that **Joseph** does not disclose where "*controlling interleaving or interleaving of data/flits from channels through said physical connection based on availability of valid data in said channels to be transferred*" (see claims 1 and 17) and "*backpressure*" (see claim 7). The examiner respectfully disagrees. **Joseph** discloses, the "*controlling interleaving of data from the two channels through the physical connection*" as disclosed in figures 2, 4; col. 3, line 40-48; col.

6, lines 59-67 wherein packets are divided into flits, interleaves by the mux 401 and transmitted over channels; *based on availability of valid data in said two channels to be transferred* (for example see figures 2-4; whenever the transport agent 200 receives packets or message for transfer (see figure 2; col. 4, lines 39-42), the second level channel puts the information into the frame buffer 307, 309 (figures 2-3; col. 5, lines 37-43) and flits come out of the second level channels for input into the flit handler device 203, e.g. "*based on availability of valid data in said two channels to be transferred*", for filling up into the availability of free slots and transferring onto the corresponding channels to destination (for example see col. 6, lines 23-58). Even though, **Joseph** does not explicitly use the word "*backpressure*"; however, it is obvious that the response from the destination for the request from the source (see col. 5, lines 61-63) is the "*backpressure*" from the destination to the source for optimizing data transfer with more dynamic as specified in col. 8, lines 2-6. Therefore, Examiner concludes that the combination of **Joseph** and **Walsh** teaches the arguable features.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, **Joseph** discloses a network interface for improving the performance of data transmission through the packet network (see figures 1-2; col. 1, lines 9-10); **Walsh** discloses a system and method for transmitting and receiving information through the redundant local area

network, by providing a redundant adapter 18 or network interface (see figures 1-4) with different controllers for each communication link. Accordingly, it is obvious from knowledge of one of ordinary skill in the art to implement the use of different controllers for each link as taught by the **Walsh**'s redundant adapter into the **Joseph**'s network interface, for the purpose of redundancy and reduce latency in processing data with multiprocessor system as disclosed in **Walsh**: col. 1, lines 54-65. The motivation being that this can improve the performance of data transmission through the network.

Allowable Subject Matter

8. Claims 14, 23-24 and 26-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Deneroff et al. (U.S.6,751,698) and **Zhonghai et al.** ("Flit admission in on-chip wormhole-switched networks with virtual channels", System-on-Chip, 2004, Proceedings 2004 International Symposium on 16-18 Nov. 2004, page(s): 21-24; and "Flit ejection in on-chip wormhole-switched networks with virtual channels", Norchip Conference, 2004, Proceedings 8-9 Nov. 2004, page(s): 273-276) are all cited to show devices and methods for improving the

performance of data transmission in the communication architectures, which are considered pertinent to the claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tri H. Phan, whose telephone number is (571) 272-3074. The examiner can normally be reached on M-F (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi H. Pham can be reached on (571) 272-3179.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(571) 273-8300

Hand-delivered responses should be brought to Randolph Building, 401 Dulany Street, Alexandria, VA 22314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office, whose telephone number is (571) 272-2600.

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Tri H. Phan
October 30, 2006

CHI PHAM
SUPERVISORY PATENT EXAMINER 11/3/06